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Research Report: ZLC-2014-9
Balancing Supplier Portfolio in a Move Eastern & Southern Europe Context
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Balancing Supplier Portfolio in a Move Eastern & Southern Europe Context

By Seungyeop Lee

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Summary: The goal of this thesis is to find the optimal supply portfolio model for the company's migration to Eastern Europe by the end of 2014. By applying the portfolio model with a migration strategy, the company will be able to not only decrease all relevant costs but also minimize all risks in the east. To develop the optimal supplier base model, basically Cost & Risk Model is used and its application will be maximized with the tool that is a user-friendly. We anticipate that the company will be satisfied with this model and cause its migration be more productive and efficient.

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KEY INSIGHTS

1. When it comes to balancing portfolio in Eastern Europe, minimizing all relevant costs and risks will be the key drivers.
2. End result of this project is to suggest the optimal supplier base model, considering all kinds of costs as well as risks in the eight-targeted countries in Eastern Europe.
3. Among the eight-countries in Eastern Europe, Czech, Slovakia and Lithuania are the best countries as a new supply base.

Introduction

Most companies these days face a variety of issues, problems, and uncertainty in terms of Supply Chain Management and Logistics. As the product life cycle becomes shorter, and transportation cost and raw material cost are increases, companies have to determine an optimal supplier portfolio model in order to minimize cost and risk. In this sense, this thesis will make it possible for companies to find their optimal model in supplier bases. This thesis is about the world's largest oilfield service company, which has more than 100,000 suppliers worldwide and annually spends more than ** billion on 3rd party suppliers. Recently the oil and gas industry's dynamism in emerging markets has led to the company to move to an Eastern Europe strategy to shift *% of its spend by the end of 2014 to targeted countries in order to lower total cost of ownership (TCO). The goal of this thesis is not only to find the key drivers to balance supplier portfolio, but also to recommend the optimal supplier portfolio in terms of supply base in Eastern Europe countries. In addition, a variety of potential risks and costs, including shifting cost should be precisely analyzed. To sum up, the ultimate goal of this project is to find a concrete mathematical tool evaluating all relevant costs and risks when the company migrates its supplier base from Western Europe to Eastern Europe. Cost & Risk Model will be used for creating the tool, which has to be user-friendly for solving real-world problems as well as providing on-site training.

Methodology

We needed to thoroughly analyze data the company sent us. Fortunately, that information was enough to assume all relevant factors we wanted to figure out. By analyzing them, we were able to come up with annual spend, regional spend, list of targeted countries, supplier information, departure countries, arrival countries, segment, category, and so on.

2012		2013		Change
Region	Spend(kUSD)	Region	Spend(kUSD)	
NSG	433291	NOR	681580	173%
NAG	195476	UKG	500160	
CEU	163716	CEU	228807	40%
		NAG	225895	16%
TOTAL	792483		1636442	106%

The objective of this project is to identify the optimal supply portfolio. We invented Optimal Portfolio Model (OPM) to achieve the lowest cost and risk solution. In each section, the objective will be both to minimize total costs and to minimize total risks. OPM consists of risk model and risk model, and consequently we put them together to find the best supplier bases or countries among eight-targeted countries when considering all risks and costs. Currently the company plans to 10% of total spend in Eastern Europe, which is the eight-targeted countries: Czech, Estonia, Latvia, Malta, Lithuania, Slovenia, Slovakia and Ukraine. By using OPM, we are able to rank the eight-targeted countries from one to eight, which is our optimal supply base as well as our conclusion for the sponsor company.

Optimal Portfolio Model

We introduce the Optimal Portfolio Model that can be divided into two parts: the cost model and the risk model. The objective is to minimize the total costs and total risks. We aim to find the optimal portfolio that recommends the optimal positioning in terms of supply bases in Eastern Europe countries of Czech Republic, Estonia, Latvia, Lithuania, Malta, Slovakia, Slovenia and Ukraine. The model should analyze and include all relevant risks and costs of shifting spend to these countries, identify the resources required to achieve this goal and finally recommend the optimal portfolio through modeling of the key drivers.

Initially we considered a lot of cost factors such as transportation cost, carrying cost/inventory holding cost, raw material cost, labor cost, ordering cost, tax, tariff, warehouse cost, obsolescence costs, D&A (depreciation and amortization), agent cost and etc. In this thesis, for the sake of simplicity, we consider only five key elements: transportation cost, raw material cost, labor cost, tax and pipeline inventory cost. Other key factors, such as lead time or agent cost, are not considered in this thesis because the sponsor company's confidential reasons.

On the other hand, we had difficulty in segmentation and categorization of risk factors mainly because risk factors are hard to quantify. To develop the risk model, we first divide factors into external and internal factors, and classify them into four categories, such as 'Financial Risk', 'Operations Risk', Strategic Risk' and 'Hazard'. Like cost model, only four key factors will be considered for the risk model in this thesis.

In terms of Total Risk, we considered four factors and ranked the eight-targeted countries from one to eight to exclude from the potential countries in Eastern Europe. If a certain country has a C grade in each part, the country should be exempt due to high risk. Likewise, the country would also be exempt if a country has a C grade in cost model.

Transportation cost, Raw Material Cost, Labor Cost, Tax and Pipeline Inventory Cost account for the Total Cost Model, while Financial Ratings (S&P, Moody's and Fitch), Natural Disasters, Labor Strikes and Country Risk Index account for the Total Risk Model. The main idea of two models is summarized below:

- *Total Cost (TC) = Trans Cost + Raw Material Cost + Labor Cost + Tax + Pipeline Inventory Cost*
- *Total Risk (TR) = Financial Ratings + Natural Disasters + Labor Strikes + Country Risk Index*
- *Objective: finding the optimal supplier base (countries) when we consider all risk and all costs*

Cost Tool

The Cost Model was created on the basis of five components: Transportation Cost, Raw Material Cost, Labor Cost, Tax and Pipeline Inventory Cost. The most significant characteristic of the cost model is user-friendly. Any user can select the weighted value and can change each value on-demand. The sum of weighted value should always be ten and minimum value is one as you can see in the table.

Total Scale is 10 to 50. For instance, minimum requirement is 41 to get an A grade in cost model, and 31 for a B grade. On the basis of Total Scale (10-50), we consequently get cost ranking from one to eight. In other words, the country ranked no. 1 is

the most cost effective and recommendable when it comes to migration from West to East in this thesis.

COST RANKING	GRADE	SCORE
1 Latvia	B	39
2 Lithuania	B	37
3 Ukraine	B	36
4 Czech	B	31
4 Estonia	B	31
4 Slovakia	B	31
7 Slovenia	C	27
8 Malta	C	23

GRADE	SCORE
A: 41-50	*(5) Excellent*
B: 31-40	*(4) Very Good*
C: 21-30	*(3) Good*
D: 11-20	*(2) Fair*
E: 10	*(1) Poor*

			1	2	3	4	5
		Weighted Value	Tranportation	Raw Material	Labor	Tax	Pipeline Inv
	GRADE	*10*	*1*	*3*	*3*	*1*	*2*
Czech	B	31	5	9	6	3	8
Estonia	B	31	1	9	9	2	10
Latvia	B	39	2	12	12	3	10
Lithuania	B	37	2	12	12	3	8
Malta	C	23	2	3	3	5	10
Slovakia	B	31	4	9	6	2	10
Slovenia	C	27	5	6	3	3	10
Ukraine	B	36	1	15	15	3	2

SCALE (10-50)

Risk Tool

It is well known that risks are very hard to quantify and compare. Because of this, the best way to evaluate them is to apply different parameters to each one when we calculate total risks for the optimal supply base model. By using different parameters, we are able to rank the eight-targeted countries from 1 to 8 as follows and use this data to find the optimal supply base model in Western Europe.

RISK RANKING	GRADE	SCORE
1 Estonia	A	44
2 Slovakia	A	42
3 Malta	B	39
4 Czech	B	38
4 Latvia	B	38
4 Lithuania	B	38
7 Slovenia	C	30
8 Ukraine	C	24

GRADE	SCORE
A: 41-50	*(5) Excellent*
B: 31-40	*(4) Very Good*
C: 21-30	*(3) Good*
D: 11-20	*(2) Fair*
E: 10	*(1) Poor*

			1	2	3	4
		Weighted Value	Fin. Ratings	Disasters	Labor Strikes	Country Risk
	GRADE	*10*	*4*	*1*	*3*	*2*
Czech	B	38	16	1	15	6
Estonia	A	44	16	5	15	8
Latvia	B	38	12	5	15	6
Lithuania	B	38	12	5	15	6
Malta	B	39	12	4	15	8
Slovakia	A	42	16	3	15	8
Slovenia	C	30	4	5	15	6
Ukraine	C	24	4	1	15	4

SCALE (10-50)

Similarly, a user can select weighted values for Financial Ratings, Disasters, Labor Strikes and Country Risk. For example, a user may think that Natural Disaster is crucial for migration to Western Europe, and put 4 or 5 in the cell rather than 1 as the data shows below.

The purpose of this risk model is to exclude some countries that have high risk in some sectors. Although a certain country may be very cost-effective in the cost model, it should be excluded from the list of suggested countries if the risk grade is much lower than other countries such as Slovenia and Ukraine, which earned a C grade. In other words, those countries are not appropriate when the company is considering moving its supply base to the east since risks are too high compared with others. Thus these should be exempt.

Cost & Risk Tool

Computing Cost & Risk Tool is the ultimate goal of this thesis because we can compare all cost factors with all risk factors at a glance.

COST MODEL	GRADE	SCORE	Tranportation	Raw Material	Labor	Tax	Pipeline Inv
1 Latvia	B	39	2	12	12	3	10
2 Lithuania	B	37	2	12	12	3	8
3 Ukraine	B	36	1	15	15	3	2
4 Czech	B	31	5	9	6	3	8
4 Estonia	B	31	1	9	9	2	10
4 Slovakia	B	31	4	9	6	2	10
7 Slovenia	C	27	5	6	3	3	10
8 Malta	C	23	2	3	3	5	10

RISK MODEL	GRADE	SCORE	Fin. Ratings	Disaters	Labor Strikes	Country Risk
1 Estonia	A	44	16	5	15	8
2 Slovakia	A	42	16	3	15	8
3 Malta	B	39	12	4	15	8
4 Czech	B	38	16	1	15	6
4 Latvia	B	38	12	5	15	6
4 Lithuania	B	38	12	5	15	6
7 Slovenia	C	30	4	5	15	6
8 Ukraine	C	24	4	1	15	4

COST & RISK	GRADE	SCORE	
1 Latvia	A, B	77	TOP 3
2 Lithuania	A, B	75	TOP 3
2 Estonia	A, B	75	TOP 3
4 Slovakia	A, B	73	TOP 5
5 Czech	B, B	69	TOP 5
6 Malta	B, C	62	OUT
7 Ukraine	B, C	60	OUT
8 Slovenia	C, C	57	OUT

GRADE	SCORE
A: 41-50	*(5) Excellent*
B: 31-40	*(4) Very Good*
C: 21-30	*(3) Good*
D: 11-20	*(2) Fair*
E: 10	*(1) Poor*

First, we can find which country is the most cost effective or which country requires the highest shifting cost from the cost model. As we can see the data below, Latvia, Lithuania and Ukraine are top three countries. Thus, if the sponsor company considers moving its supplier base to Eastern Europe, we strongly recommend these three countries in terms of total costs.

Second, Estonia, Slovakia and Malta are the safest countries among the eights. On the other hand, Slovenia and Ukraine are risky countries and should be considered in this migration of the company. In this project of migration, any country having a C grade shouldn't be considered.

Lastly, we need to put them together to compare with. Unfortunately, there countries (Slovenia, Malta and Ukraine) should be exempt regardless of other grade due to their C grades in cost model or in risk model. Those countries were not able to meet the minimum requirement for this cost and risk model. Now we easily know that Latvia, Lithuania, and Estonia are the winner of this project and recommend these three countries are definitely the most recommendable considering all risks and costs.

Results & Conclusions

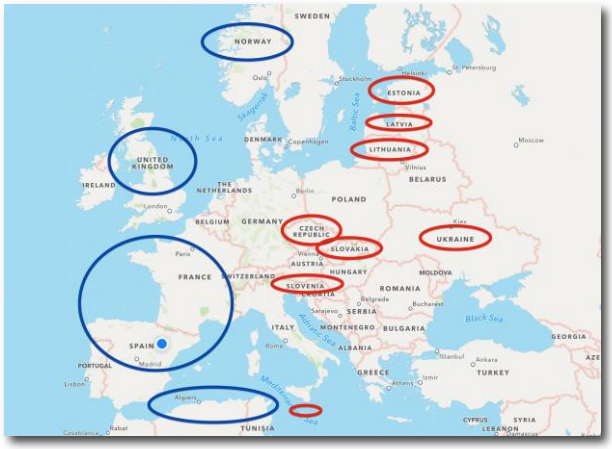
After putting both the cost model and risk model together and comparing them with each other, we can come up with which of the eight-targeted countries would be the best in composition of the supplier portfolio in E&S context, which is the end result of this project.

COST & RISK	GRADE	SCORE	
1 Latvia	A, B	77	TOP 3
2 Lithuania	A, B	75	TOP 3
2 Estonia	A, B	75	TOP 3
4 Slovakia	A, B	73	TOP 5
5 Czech	B, B	69	TOP 5
6 Malta	B, C	62	OUT
7 Ukraine	B, C	60	OUT
8 Slovenia	C, C	57	OUT

In terms of the cost model, the big 3 would be Latvia, Lithuania and Ukraine while Estonia, Slovakia and Malta would be the big 3 countries when it comes to the risk model. Some countries, however, should be exempt from this consideration mainly due to their high risk and cost factors. These three countries are Malta, Ukraine and Slovenia.

	Compositions	# of Composition	Reference
Porfolio 1	Latvia & Lithuania	2 countries	Relatively cost-conscious company
Porfolio 2	Latvia & Estonia	2 countries	Relatively risk-conscious company
Porfolio 3	Latvia, Lithuania & Estonia	3 countries	Cost & Risk conscious company
Porfolio 4	Latvia, Lithuania, Estonia, Slovakia & Czech	5 countries	Considering diverse countries
Porfolio 5	Estonia, Slovakia & Malta	3 countries	Considering risk factors only
Porfolio 6	Latvia, Lithuania & Ukraine	3 countries	Considering cost factors only

To sum up, we are able to make six scenarios from Portfolio 1 to Portfolio 6 for the sponsor company. If a company consider two countries and is relatively risk-conscious, the best scenario would be Portfolio 2 because Estonia ranked the number one in (A Grade, Score 44) in risk model. Likewise, if a company is risk and cost conscious and consider three countries, we would recommend Portfolio 3, which consists of Latvia, Lithuania and Estonia. Lastly, a company wants to have more diverse portfolio, the answer would be Portfolio 4 and it consists of five countries: Latvia, Lithuania, Estonia, Slovakia and Czech. As we can see the examples above, the sponsor company can consider diverse scenarios according to its business conditions. By using the risk & cost model, the company can depict the best situation when moving its supplier base from West to East by the end of 2014.



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